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Some Neglected Aspects of Sustainable Development

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The concept of sustainable development, obscure just 15 years ago, now appears regularly in the mainstream media. There is now even a Dow Jones Sustainability Index to guide managers to opportunities for securing “green growth.”

Chairman Alan Greenspan and the Federal Reserve System have also given the concept pride of place: in its formal announcement on interest rate policy in January 2003, the Fed cited sustainable development as a goal coequal with price stability. That same month, when President Bush announced in the 2003 State of the Union address new initiatives on fuel cells to convert chemical energy into electricity and heat, that too was couched in sustainable development terms. The president even made a point of being photographed examining a hydrogen powered car that would vastly reduce pollution and sharply increase long-term energy availabilities.

Under other labels, sustainable development has long engaged the interests of physical and social scientists. At the beginning of the nineteenth century, Rev. T. R. Malthus predicted an inexorable, inevitable collision between population and subsistence. Through a series of staggering revolutions in industry, science, and technology never envisioned by Malthus, this apocalypse has been deferred time and again. Nevertheless, there is no assurance that humankind can continue to count upon technological innovation to keep the Malthusian wolf at bay. Increasingly, we will need to turn our attention to the possibilities for creating conditions for sustainable use of nature’s bounty. Sustainable development is all about trying to bring about green growth, which

benefits both the natural environment and the humans who depend upon it for clear air, clean water, healthy foodstuffs, and so much else. This chapter will address not the whole panorama of sustainable development but some neglected aspects of good policies to promote sustainability.

The search for paths of sustainable development necessarily involves many disciplines: ecology, biology, geology, economics, sociology, ethics, political science, mathematics, physics, chemistry, statistics, and engineering. There is no universal agreement on what is meant by sustainable development. Nor are all definitions of sustainable development sensible. But for the ecologists, economists, and biologists who understand the essence of resource scarcity, sustainable development may be best defined as the path that maximizes the long-term, net benefits to humankind, taking into account the costs of environmental degradation. Net benefits include not merely income gains and reduction of unemployment and poverty but also healthier living conditions. Interpreted in this way, sustainable development stresses not the need to limit development but the need to develop sensibly, in order to be better able to conserve. Sustainable development seeks to make conservation the handmaiden of development while protecting the interests of future generations. In sensible sustainable development, preservation is valued not for its own sake but for what it can do for the welfare of present and future generations. One vital condition for approaching sustainability in development is that natural resources and environmental services not be undervalued or underpriced, a condition frequently violated in practice. This is the chapter's prime focus.

THE ROLE OF POVERTY

Sustainable development is an important concept for all societies. Nevertheless, poor people in developing countries are far more dependent on their soils, rivers, fisheries, and forests than are citizens of rich countries. Therefore, degradation of resources and environment looms as a much larger threat to life and health in developing countries. Fortunately for low-income nations, sustainable development does not necessarily imply low rates of income growth. It does, however, require less wasteful, more efficient growth.

For affluent countries such as the United States, Canada, Japan, and France, many of the most serious environmental problems are caused by affluence. Examples include too much pollution of the air from over-use and waste of motor fuel, street and highway congestion caused by the addition in each country of several hundred thousand more automobiles every year, conversion of fragile watersheds and beaches into vacation homes on Cape Hatteras or Hilton Head Island, and housing developments on mountain slopes in Aspen or Jackson Hole.

But the situation is very different in almost all of Africa, in much of Latin America, and in south and Southeast Asia. In much of the rest of the world outside the United States and Europe, many of the most serious environmental problems are caused not by affluence but by poverty. Poverty itself is the prime adversary of good ecological practices in poor nations. For example, there can be little doubt that poverty by itself, or in combination with other factors, is the main cause of deforestation in most tropical nations.

Consider Ghana. In 1900, one-third of Ghana's land area was covered by natural tropical forest. When I first worked in Ghana for Harvard University in 1967–1971, the forest still covered about 20 percent of the land; there was still a lot of forest for me to study. That is no longer the case. By 1995, forest cover had shrunk to less than 5 percent. As elsewhere in West Africa, Southeast Asia, Brazil, and Central America, poverty has been killing the forest. Poor, landless Ghanaians, Ivorians, Indonesians, and Burmese practice destructive, slash-and-burn agriculture, not because they are ignorant or venal, but because they have no other options. These are not the traditional shifting cultivators of Africa or Asia who for centuries past have moved from parcel to parcel. Rather, they are landless, mostly urban people who have become "shifted cultivators," driven to migrate to the forest by hunger and population pressures.

Slash-and-burn agriculture is only one manifestation of the effects of poverty on deforestation. In many poor nations, the role of poverty in deforestation has been magnified by the ever-more-desperate search for fuelwood by impoverished people. In Ghana in the mid eighties, for example, for every tree harvested for lumber, nine trees were cut down for firewood, leading to a pattern of deforestation that accelerated soil erosion, groundwater depletion, and loss of agricultural productivity. For developing nations generally, 80 percent of trees cut down are

felled for fuel for cooking or other domestic use, not for export as logs or wood products.

Most of the species on earth occur in the tropical forest. The tropical forest used to make up 12 percent of the earth's land surface before extensive deforestation began. Now it covers less than 6 percent of the earth's land. Worldwide, the tropical forest estate shrank by more than 55,000 square miles per year in the early nineties, an area roughly 240 miles square, or the size of Iowa. Of that amount, almost 60 percent fell to slash-and-burn agriculture. Another 3,900 square miles, an area 62 miles square, was deforested by the search for fuelwood. Forest clearing for cattle ranching, mostly in Brazil and Central America, took another 5,850 square miles per year, or 76 miles square.

It is important to note that the role of poverty-induced shifting cultivation in deforestation has been steadily increasing, while the relative roles of logging and cattle ranching have been declining. Nearly 1.5 billion people in the world live in absolute poverty; at least a third of these are landless poor engaged in destructive forms of shifting cultivation. The number of these poor is growing, so we should expect growing damages from shifting cultivation.

The point: so-called solutions to tropical deforestation that do not take into account the needs of the poor and landless are no solutions at all; they worsen the conditions of the poor in almost every instance.

In forestry, fishing, agriculture, or natural resource extraction, poverty is, of course, far from the only culprit in national resource degradation. Two other shortcomings have undercut sustainable development: market failure and policy failure. We have long known that market failure has been instrumental. Market failure arises when valuable services provided by an ecosystem are not traded in markets. For example, intact tropical forests provide a wide variety of vital but nontraded ecological services such as control of runoff, soil protection, microclimate control, and protection of animal habitat. Because there are no organized markets for such services, they are not priced and are therefore overused (wasted). However, some progress in valuing these vital services has been made over the past two decades (Repetto and Gillis 1988).

But market failures, whether due to monopoly, externalities, free riders, or transaction costs, now involve few mysteries. They have been studied for many decades by economists, at mind-numbing length. While it has long been recognized that market failure accounts for an

important part of the story, it is now much more widely appreciated that policy failures, or government failures, have also loomed quite large in environmental degradation.

THE ROLE OF POLICY FAILURES

One of the prime causes of policy failure leading to needless ecological and economic damage has been a widespread tendency of policymakers to overlook the environmental consequences of nonenvironmental policies. Even today it is still not widely recognized that policies intended primarily to attain nonenvironmental goals can have large impacts upon the environment. Nonenvironmental policies include tax policy, exchange rate policy, industrialization policies, credit, and agriculture and food price policies. In much of Africa, Latin America, and Asia, a by-product of the pursuit of agricultural, energy, urbanization, and industrial objectives has been significant corrosive effects upon soil endowments, watershed management, water quality, coastal fishing, and survival of coastal reefs. From this experience, we should have learned that it is not enough that nations follow sensible environmental policies. Greater attention to the environmental impact of nonenvironmental policies and development projects is required as well, not only for more efficient resource use, but also for more equitably distributed growth. Ecological disasters are almost always economic disasters too; in low-income countries the reverse is often true as well, as illustrated by the experiences of Romania, Bulgaria, and Albania over the past five decades. Little imagination is required to see that measures that reduce the environmental damages of nonenvironmental policies are both good ecology and good economics, while policies that help to overcome poverty are also both good economics and good ecology.

A second, not unrelated, reason for policy failures that damage ecological and environmental values has been a persistent lack of understanding of the role of the market and the role of prices in both resource conservation and ecological protection. An unusually high proportion of such policy failures is traceable to short-sighted government subsidy programs that deeply underprice water, soils, forest, and energy resources. A perfect example occurred on public lands out West, where

the United States government charges extremely low prices for grazing leases, leaving pastures cow-burnt from overgrazing.

Everywhere, societies persist in underestimating the role of market prices in resource conservation or in resource allocation generally. Another recent example from the United States comes from outside of the environmental area: pricing of Internet access. A few years back, a major company adopted a pricing mechanism involving a flat fee for Internet service: this amounted to a zero price for overuse of scarce Internet access. Because the price of the service was not incremental, it was unrelated to intensity of use by the subscriber. And the managers were actually surprised when the scheme resulted in catastrophic collapse from overuse. Although this example has nothing to do with natural resources, the same kinds of miscalculations are often responsible for unsustainable development. Virtually all of the policy failures I am about to depict have resulted primarily from deep underpricing of vital natural and environmental resources, leading to unsustainable, wasteful development.

Forestry Resource Policy

Quite apart from the effects of poverty, policy failures in forestry have been especially destructive to ecological and economic goals in dozens of tropical countries. Brazil's government long provided heavy subsidies to ranching and other activities that encroached heavily on the Amazon rainforest. Three to four thousand square miles of the Amazon was deforested each year throughout the 1970s. When pastureland replaced the rainforest, it destroyed rainforest occupations, such as plant collection and harvest of forest meat, that provided more jobs than the subsidized ranching operations. Nevertheless, the government made deforestation as cheap as possible. Government policies provided new ranchers with 15-year tax holidays, investment tax credits, exemptions from export taxes and import duties, and loans with interest substantially below market rates. Although a typical subsidized investment yielded a loss to the economy equivalent to 55 percent of the initial investment, heavy subsidies allowed private ranchers to earn a positive return of 250 percent, on average, of their investment, while the forest was relentlessly destroyed.

Most tropical countries, including Indonesia, the Philippines, and many African nations, have charged very low fees for timber concessions, and virtually all impose inadequate timber royalties too low to encourage conservation. Thailand's forestry policies were so wanton that its rainforest has all but disappeared. The same can be said for the Ivory Coast, and Gabon and the Philippines are on the same path.

Water Resource Policy

Underpricing of water resources has long been common all over the world. It is safe to say that where one finds acute crisis in water availability, heavy subsidies for water use are usually the prime suspect, except for regions with extended drought.

Subsidies apply both to agricultural water and to potable water. By 1990, public irrigation systems operated by government owned enterprises and by governmental departments in developing countries had already absorbed \$300 billion in public funds. It has been estimated that over half of all investments in agriculture in less developed countries (LDCs) in the 1980s went into water resource development; in Mexico fully 80 percent of all public investment in agriculture from 1940 to 1990 went into irrigation projects (Gillis 1991, pp. 248–256). There, charges for irrigation water average only 11 percent of total costs. And in a sample of World Bank irrigation projects in less developed countries, revenues covered only 7 percent of project costs, on average, while in most other countries revenue from farmers covers less than 20 percent of capital and operating costs (Repetto 1986, p. 43). When a resource is underpriced, it will be overused and wasted. Cheap prices for irrigation water have, of course, resulted in high rates of water waste, whether from the Colorado River, the Indus River, or the Aral Sea of the former Soviet Union, straddling Uzbekistan and Kazakhstan.

Markets also have other roles to play in the sustainable use of drinking water. In most of the world, provision of drinking water is dominated by government departments or government-owned enterprises. But in dozens of those countries, infant mortality from unsafe water remains high. Three million children a year die from water related diseases. What are the possible implications for health and for efficiency when reliance is placed on market mechanisms instead of on government enterprises to provide water? Here is one example.

In the 1990s Argentina embarked on one of the largest privatization campaigns in the world, including the privatization of local water companies serving approximately 30 percent of the country's municipalities. American and Argentinean researchers found child mortality fell 8 percent overall in areas that privatized their water services; the effect was largest (26 percent) in the poorest areas. Privatization there was associated with significant reductions in deaths from infectious and parasitic diseases.

Energy Resource Policy

Energy pricing provides an altogether frightful history of policy failure leading to unsustainable development. In such oil-rich countries as Nigeria, Indonesia, and Venezuela, domestic use of energy has been kept artificially cheap as a stimulus to industrialization and diversification. This has had multiple adverse effects on ecology and on the economy. First, these subsidies encouraged wasteful domestic consumption, thereby reducing the country's petroleum and gas reserves and its export earning potential. Second, underpricing of energy artificially promoted the use of auto transport, adding to urban congestion and air pollution. Third, artificially cheap energy promoted industry that was ill-suited to the country's endowments: with cheap energy, industries (and consumers) have little incentive to adopt energy-saving technologies. Thus, on several counts, underpricing contributed to environmental degradation as well as to sizable economic losses from needless waste of energy.

Indonesia's kerosene policy furnishes another instructive example. For 15 years the government of Indonesia heavily subsidized the consumption of kerosene and other fuels. The kerosene subsidy was justified as a way to reduce environmental degradation and to aid poor rural dwellers, who were thought to use kerosene for cooking. Heavily subsidized kerosene prices were seen as a disincentive to the cutting of fuelwood, which was denuding mountain slopes and causing major soil erosion on Java, Indonesia's most densely populated island. But the subsidy was totally misplaced. Research clearly showed that rural families used kerosene predominantly for lighting, not for cooking. In any case, the subsidy protected only 50,000 acres of forestland each year, at a cost of almost \$200,000 a year per acre. Replanting programs, in contrast, cost only \$1,000 per acre. Moreover, 80 percent of the kerosene turned

out to be consumed by the relatively wealthy, not the poor. And the low price of kerosene made it necessary to subsidize diesel fuel as well, because kerosene could be substituted for diesel in truck engines, causing greater environmental damage. The multiple costs of this policy finally led the government to sharply reduce its subsidy on kerosene. Indeed, Indonesia now tries to price most fuels at world market levels.

Some of my colleagues have studied commercial energy use per unit of GDP for almost 90 countries. The variance in utilization of commercial energy, even among poor countries, is notable. Mistaken energy policies are principally, but not wholly, to blame for very high rates of domestic energy consumption in countries like Colombia, Bolivia, and Venezuela. Even recently, Venezuela has priced gasoline at less than 30 cents a gallon. The environmental consequences of underpricing energy were particularly notable in countries formerly under the control of communism, such as Poland, Bulgaria, Hungary, Czechoslovakia, and Romania, where markets played little role in resource allocation until the 1990s. Consequently, air and water pollution in these nations were among the worst in the world.

Agricultural Subsidy Policy

Another arena for environmental policy failure has been agricultural subsidies. These have yielded notable economic and ecological damage everywhere, but especially in poor nations. Governments all around the globe have adopted policies that have resulted in severely underpriced chemicals, especially fertilizer made from natural gas. Attempts have been made to justify heavy fertilizer subsidies not only on grounds of their effect on agricultural production, but also on grounds that the subsidies serve soil enrichment and conservation purposes. These arguments do not stand up to analysis, particularly in semiarid tropical countries where what is most needed are organic fertilizers (which are better adapted but rarely subsidized) and the use of moisture-retaining methods. Indeed, there is evidence that sustained use of chemical fertilizers can actually reduce soil fertility over the long term. Furthermore, overuse of subsidized fertilizer and other chemicals such as pesticides and herbicides has often caused significant environmental damage rather than providing environmental protection, and high subsidies on fertilizer have led to substantial waste. In Indonesia, for ex-

ample, fertilizer use increased by 77 percent from 1980 to 1985 alone, to the point that rice cultivation in that nation used three times as much fertilizer per hectare as Thailand or the Philippines (World Commission on Environment and Development 1987, p. 102).

Finally, many agricultural subsidies have not only been expensive but strongly counterproductive. This was the case with heavy pesticide subsidies, also in Indonesia. Not only did the overused pesticides damage the environment but they also proved ineffective: they actually increased infestations of agricultural pests because they had a greater effect on the natural predators of pests than on the pests themselves.

WHAT CAN BE DONE?

In the face of persistent market failures and ubiquitous policy failures, is sustainable development in poor nations even possible? The answer is, I believe, a qualified yes, at least for any one country, provided attention is strongly focused on rectifying both market failures and policy failures that corrode sustainability, and on measures to reduce rural poverty.

The Malaysian case is instructive. Malaysia contains plenty of contemporaneous examples of both sustainable and nonsustainable development. West Malaysia is separated from East Malaysia in the South China Sea by nearly 400 miles of ocean. West Malaysia consists primarily of the Malaysian Peninsula, whereas East Malaysia includes the two states of Sabah and Sarawak, on the island of Borneo.

After an inauspicious, largely wasteful start in the twentieth century, West Malaysia has enjoyed mostly sustainable development for nearly three decades because it finally successfully capitalized upon its initial natural resource base. Real economic growth was in excess of 3 percent from 1965 to 1990 and has been at nearly 5 percent since. This rapid growth has virtually banished rural poverty as a cause of deforestation and other environmental degradation. Moreover, the environment in Peninsular (West) Malaysia has suffered only lightly from policy failures.

Sabah and Sarawak in East Malaysia had, if anything, an even richer natural resource base than Peninsular Malaysia. But for Sarawak since the mid-1980s and Sabah since 1970, development has been un-

sustainable. Efforts at sustainable development in Sarawak continue to be plagued by the scourge of rural poverty, while in both Sarawak and Sabah, natural forest endowments have been consumed by unsustainable practices, largely as a result of serious policy failure, particularly through grossly misguided forestry policy involving subsidies to timber firms.

In any case, the answer to the question, “Can economic development be sustainable?” is yes for any given country that pays appropriate attention to resource scarcity and avoids artificially cheap prices for natural resources and environmental services. But the answer becomes much less certain when we consider sustainability for the entire planet, or global sustainability.

The Malthusians are still with us, insisting that growth cannot be sustainable. Some argue that what sustainable growth means is that the rich have to sharply curtail their living standards to make room for more consumption by the poor. The implicit assumption is that the reason poor people are poor is that rich people are rich: that is, that they consume more than their fair share of resources. But is this the cause? Jeff Sachs, director of Columbia University’s Earth Institute and special advisor to United Nations secretary-general Kofi Annan on poverty, says that rich people in rich countries are rich because they have developed technology to successfully deal with challenges, and because of geographical advantage.

CONCLUSION

Mainstream economics offers hope. In the short term we can make incremental progress in rectifying market failures leading to environmental degradation. And in the short and long term we can do a great deal to reduce damages from policy failures. Given that this is so, one major feature of a strategy for global sustainability would be to move quickly toward more effective markets, so that real resource scarcities will be reflected in the prices people pay for all commodities and services. An end to underpricing and heavy subsidies on fuels, fertilizers, pesticides, water, timber, land clearing, and other destructive uses of resources would be a major step towards sustainability. Most countries are far from this ideal market environment. They could easily reduce

resource wastage without jeopardizing economic growth, through better policies, better pricing of scarce natural resources, in some cases judicious reliance on privatization, and above all, measures to reduce poverty, especially in rural areas.

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